

What is claimed is:

1 1. A system for *in situ* x-ray study of electrode component  
2 performance in a rechargeable electrochemical energy storage  
3 cell comprising a combination of opposed polarity electrode  
4 members and interposed separator member with electrolyte

5 c h a r a c t e r i z e d i n t h a t

6 a) said system comprises means hermetically enclosing said  
7 combined electrode, separator, and electrolyte cell components  
8 in isolation from ambient atmosphere; and

9 b) said enclosing means comprises an integral x-ray  
10 transmissive window member situated to allow incidence  
11 therethrough of such radiation upon an electrode member site  
12 under study.

13 2. A system according to claim 1 which comprises:

14 a) a body providing a cylinder for receiving therein  
15 components of said cell member combination;

16 b) sealing means surrounding the proximal end of said  
17 cylinder;

18 c) a base plate providing a radiation access opening  
19 situated adjacent said cylinder proximal end and aligned  
20 concentrically therewith and within the circumference of said  
21 sealing means;

22 d) said window member being situated intermediate said base  
23 plate and said sealing means and extending peripherally beyond  
24 said sealing means;

25 e) means for removably affixing said base plate to said body  
26 and compressing said sealing means against said window to form  
27 an hermetic seal therewith;

28 f) adjustable means situated at the distal end of said  
29 cylinder for applying compressive force urging said combination

18 of cell components within said cylinder toward contact with said  
19 window member; and  
20 g) means for hermetically sealing said cylinder distal end.

1 3. A system according to claim 2 wherein:

2 a) said body, said base plate, and said electrode member  
3 under study are in electrical continuity;

4 b) said adjustable means comprises an electrically  
5 conductive piston member axially displaceable within said  
6 cylinder and in electrical continuity with the electrode member  
7 of opposed polarity to said electrode member under study; and

8 c) said cylinder distal end sealing means comprises an  
9 electrically insulating ring member fitted to the annular space  
10 between said piston member and said cylinder distal end and  
11 compressible therein to mechanically fix the axial displacement  
12 of said piston member and effect said distal end hermetic seal  
13 while electrically insulating said piston from said body.

14 4. A system according to claim 3 wherein means situated within  
15 the annular space between said piston member and the interior  
16 wall of said cylinder electrically insulates said body from cell  
17 member components in electrical continuity with said piston.

1 5. A system according to claim 1 wherein:

2 a) said electrode and separator members comprise polymeric  
3 compositions and are laminated, with electrically conductive  
4 current collector members, to form a unitary battery cell  
5 structure;

6 b) said enclosing means comprises an envelope of polymeric  
7 sheet material having said window member hermetically sealed

8 thereto about the periphery of a radiation access opening  
9 therein situated adjacent said electrode member study site; and  
10 c) said envelope is closed at its periphery in an hermetic  
11 seal about extensions of said current collector members which  
12 thereby provide external electrical communication with said  
13 enclosed battery cell structure.

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